

Outcomes of laparoscopic small ventral hernia repair using barbed suture in young females; A prospective study

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Abstract

Objective: To evaluate the outcomes of laparoscopic ventral hernia repair using barbed sutures in females.

Method: The prospective study was conducted at Civil Hospital Karachi from April 1 to November 30, 2024, and comprised females aged 18-45 years with primary ventral hernia defects of <2cm. The participants underwent laparoscopic repair with barbed sutures. Data was collected during four follow-up visits over one year. Key outcomes assessed were hospital stay duration, hernia recurrence, postoperative pain, and time to return to normal activities. Data was analysed using SPSS 20.

Results: Of the 61 women with mean age 32 ± 7 years, 49(80.3%) were discharged within 24 hours, while 9(14.75%) required 48 hours and 3(4.9%) required 72 hours. Most participants 57(93.4%) returned to work within one week. A low recurrence rate 1(1.75%) was observed during the follow-up. No major complications were reported.

Conclusion: Barbed sutures was found to be an effective and safe alternative for repairing small ventral hernia defects in young females.

Keywords: Barbed suture, Ventral hernia, Recurrence, Minimal invasive surgery, Chronic pain. (JPMA 76: 1263; 2026)

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Introduction

Hernia repair surgery is a common procedure worldwide, with an estimated 20 million hernia repairs performed yearly.¹ The primary goal of hernia repair is to achieve a durable repair and minimise postoperative complications, such as recurrence, infection, chronic pain and mesh-related complications.

Traditionally, open repairs have been widely used, but laparoscopic and robotic approaches have gained popularity due to their minimally invasive nature and potential benefits, including reduced postoperative pain, shorter length of hospital stay (LOS) and quicker recovery times.^{2,3}

The use of barbed suture system in the surgical management of ventral hernia defects <2cm remains debated, and evidence is particularly limited regarding its application in women of reproductive age who plan pregnancies.⁴ Although mesh repair significantly reduces recurrence rates and is considered the standard of care,⁵ pregnancy has been shown to increase the risk of hernia recurrence.⁶ As such, routine mesh placement may not be ideal for women planning future pregnancies. Current recommendations suggest delaying elective repair until the completion of childbearing when possible.⁷ For small

primary ventral hernias (<2cm) in women who intend future pregnancies, non-mesh repair is considered a reasonable option.⁸

The barbed suture system has emerged as a promising alternative in hernia repair. Barbed suture wound closure device is an innovative technology that closes wounds securely without the need to tie knots.⁹ It demonstrates significant reduction in suturing time and less operative time compared to non-barbed sutures.¹⁰ This non-absorbable barbed suture technology eliminates the need for knot tying and allows for the secure and rapid closure of tissue layers. The barbed sutures offer several advantages, including increased tensile strength, reduced operative time, and improved wound healing, with potentially lower rates of recurrences and complications, such as infection and seroma formation.¹¹

Mesh repair, on the other hand, involves the placement of a synthetic or biological mesh to reinforce the weakened abdominal wall, providing mechanical reinforcement, and is associated with a long-established track record of success.¹² Some studies have reported favourable outcomes with barbed sutures,¹³ while others have suggested no clear advantages of using barbed sutures over mesh repair¹⁴ or if it is more appropriate for only certain patients or types of hernias.

The current study was planned to evaluate the key outcomes of laparoscopic ventral hernia repair using barbed sutures in females.

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Patients and Methods

The prospective study was conducted at Civil Hospital Karachi (CHK) from April 1 to November 30, 2024. After approval from the ethics review board of Dow University of Health Sciences (DUHS), Karachi, the sample was raised using non-probability purposive sampling technique. The sample size was calculated using Open Epi 3¹⁵ with 95% confidence interval, 80% power, for postoperative pain scores, and 5% margin of error. Those included were females aged 18-45 years with primary ventral hernia defects of <2cm. Patients were excluded if they had recurrent hernia, prior abdominal surgery, steroid therapy, or diabetes mellitus (DM).

After taking informed consent from all the participants, data was collected. All procedures were performed laparoscopically, and barbed sutures were used without mesh placement. Postoperative pain was assessed using the visual analogue scale (VAS) score. Follow-up visits were scheduled four times over a period of one year; at 1, 3, 6 and 12 months.

For the purpose of the study, LOS was measured in days from admission to discharge. The presence of a paraumbilical hernia was confirmed clinically and/or radiologically as an abdominal wall defect within 2cm of the umbilicus. Recurrence was defined as the presence of a new or persistent fascial defect or protrusion at the site of the previous hernia repair, confirmed clinically and/or using imaging modalities. A barbed suture was defined as any commercially available knotless suture with unidirectional or bidirectional barbs used for fascial or tissue closure during surgery. Data was analysed using SPSS 20.

Results

Of the 61 women with mean age 32 ± 7 years, 31(50.8%) were aged 26-30 years, followed by 20(32.8%) aged 20-25 years, 7(11.5%) aged 31-35 years and 3(4.9%) aged 36-40

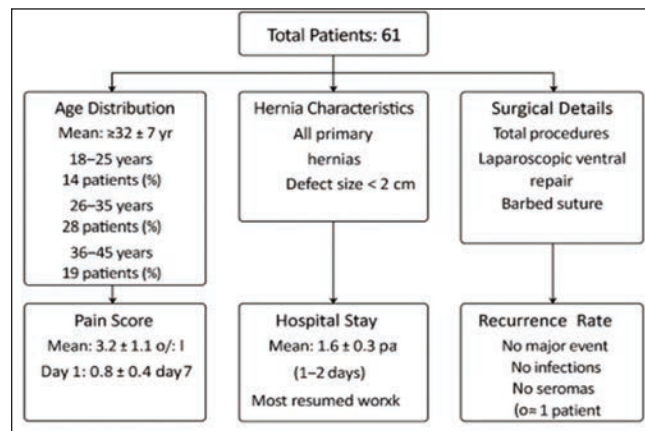


Figure-1: Results Flowchart.

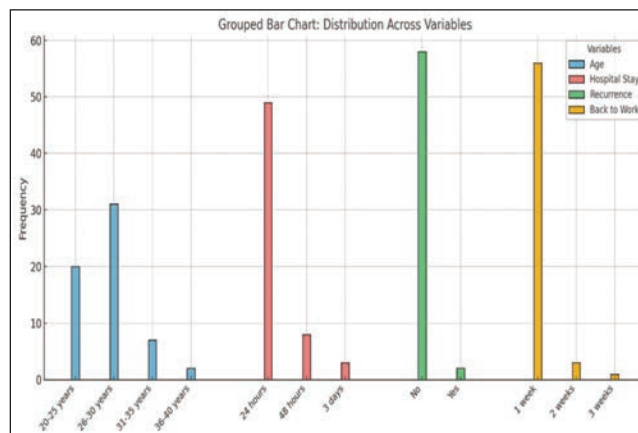


Figure-1: Grouped Bar Chart: Distribution Across variables.

years. (Figure 1).

Postoperative outcomes were favourable, with a mean pain score of 3.2 ± 1.1 on Day 1, decreasing to 0.8 ± 0.4 by Day 7. Mean LOS was 1.6 ± 0.3 days, and most patients returned to normal activities within 10 ± 3 days. No major complications were reported.

Post-surgery, 4(6.5%) patients were lost to follow-up. The recurrence rate was 1.75% during follow-up. (Figure 2).

The majority of patients 49(80.3%) were discharged within 24 hours of admission, followed by 9(14.75%) who required a stay of 48 hours, mainly due to persistent pain requiring parenteral analgesia and delayed return to normal diet, and 3(4.9%) who required a stay of 72 hours for continued observation due to mild postoperative symptoms, including nausea and low-grade fever.

A total of 57(93.4%) participants resumed work within one week of treatment, 3(4.9%) returned to work after two weeks, and 1(1.6%) required three weeks for recovery.

Discussion

The current study underscores the efficacy of barbed sutures in managing small ventral hernia defects, particularly in young female patients. The technique offers significant advantages, including reduced operative time, low recurrence rates and minimal postoperative pain as per VAS score, suggesting that it is a viable alternative to mesh repair in this specific population.

Prior research on barbed sutures has yielded mixed findings. While some studies emphasise their advantages in reducing operative time and minimising complications, others advocate their benefits over traditional suturing methods may be limited.¹⁶ Conventionally, laparoscopic suturing for defect closure in ventral hernias has been technically challenging due to various issues, such as tensile memory and knot slippage associated with

standard sutures. The introduction of barbed sutures has mitigated these challenges by providing stable suture fixation and simplifying intracorporal knotting.¹⁷ However, there are only a few studies addressing their intra-abdominal use in such settings.^{18,19}

The current study explored the application of barbed sutures for the closure of small ventral hernia defects,²⁰ with the aim of simplifying the technically demanding process and to avoid the potential complications associated with mesh usage.²¹ The findings show that most patients (80.3%) were discharged within 24 hours, aligning with modern trends emphasising minimally invasive procedures, and highlighting the benefits of shorter hospital stays, symptomatic relief and low recurrence in hernia patients.²² For the minority of patients requiring longer hospitalisation (19.7%), factors like complications or comorbidities likely contributed to extended care needs.

The rapid return to work for most participants (91.8% resuming within one week) reflects effective recovery and minimal disruption to daily activities, emphasising the economic benefits of this approach. Additionally, the low recurrence rate (3.3%) supports the efficacy of this intervention, aligning with clinical goals of achieving durable, sustainable outcomes with minimal need for additional procedures.

The current findings particularly reinforce the potential of barbed sutures in cases where mesh usage is relatively contraindicated due to increased risk of chronic pain and complications during subsequent pregnancies,⁷ making this approach highly relevant in younger female patients.

A notable strength of the current study is the prospective data collection and systematic follow-up of the participants, which allowed for accurate recording of clinical and occupational outcomes. Additionally, clearly defined inclusion criteria, standardised treatment protocols, and objective outcome measures enhanced the reliability and reproducibility of the findings. However, the study has some limitations. The relatively small sample size and the predominance of young adult participants may limit the generalisability of the findings to broader age groups or more diverse populations. Furthermore, the absence of detailed data on potential confounding factors, such as comorbidities or socioeconomic status, restricts the ability to establish causal relationships. Lastly, there is a need for long-term follow-up to assess the durability of the repair, especially in patients who may undergo future pregnancies, as these could impact the outcomes of the hernia repair.

Conclusion

The use of barbed sutures in laparoscopic ventral hernia repair for small defects in young females was found to be effective, offering low complication rates and excellent recovery outcomes. The approach was particularly suitable for women planning pregnancies, where mesh use might pose risks.

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Author Contribution:

SN: Conceived, design the analysis and idea.

IZ: Conceived, design the analysis, writing and performed the analysis.

SS: Design and implementation of the research.

AF: Collected the data.

OBK: Contributed data and analysis tools.